



I-Corps from the Trenches

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sbir.cancer.gov/icorps

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I-Corps from the Trenches

**Conversations with companies
that have gone through the program**

February 4, 2016

Michael Weingarten
Director

National Cancer Institute SBIR Development Center



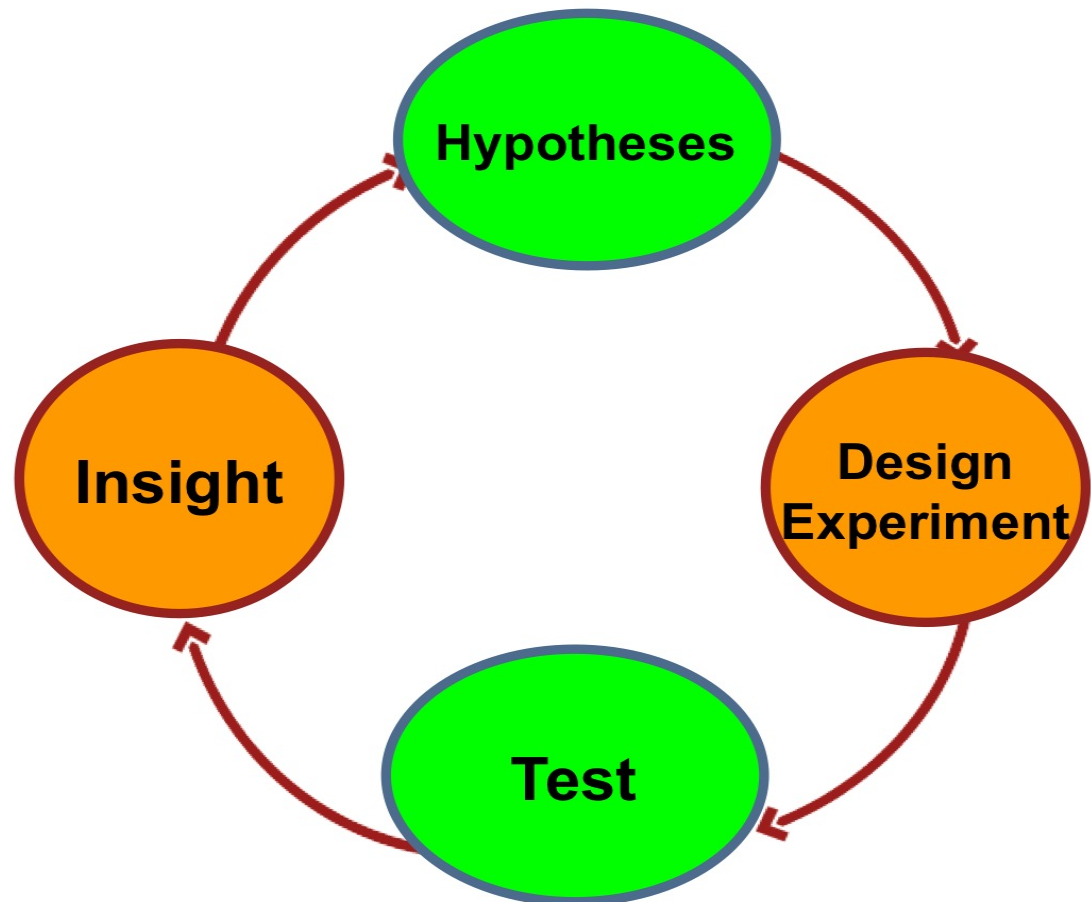
“We’re scaling up the National Science Foundation’s successful Innovation Corps program at six more federal agencies so we can help more of our scientists move their ideas out of the lab and into the marketplace.”

– President Obama (August 4, 2015)

Program Description

- Intensive ***Entrepreneurial Immersion*** course aimed at providing teams with skills and strategies to reduce commercialization risk
- Curriculum emphasizes ***Reaching out to Customers*** to test hypotheses about the need and market for the technology being developed.
 - Each team is expected to conduct over 100 interviews over 10 weeks.
- Format is focused on ***Experiential Learning***

Hypotheses Testing and Insight...



SBIR/STTR Phase II grant applications have two components

1.The Research Strategy

2.The Commercialization Plan

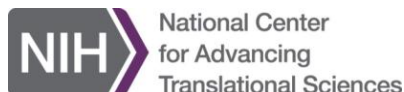
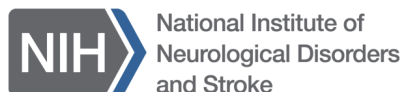
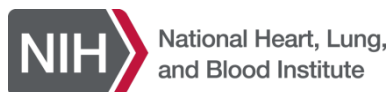
- Phase II applicants often focus on #1
- The strongest Phase II applications focus on both

Important goal of I-Corps™ at NIH is to inform the Commercialization Plan

I-Corps participants gain new insights into:

- Clinical utility
- Customers / customer segments
- Data & data quality that is needed
- Aspects of the product that are (& are not) valuable
- Roles of partners

**New insights can have a dramatic affect
on the aims of a future Phase II SBIR grant**



Pilot Program Summary

- 19 teams conducted 2,128 customer discovery interviews
- 82% found the program “very good” or “excellent”
- 82% would recommend I-Corps™ at NIH to other companies
- ***All made possible with significant planning and financial support from NSF***

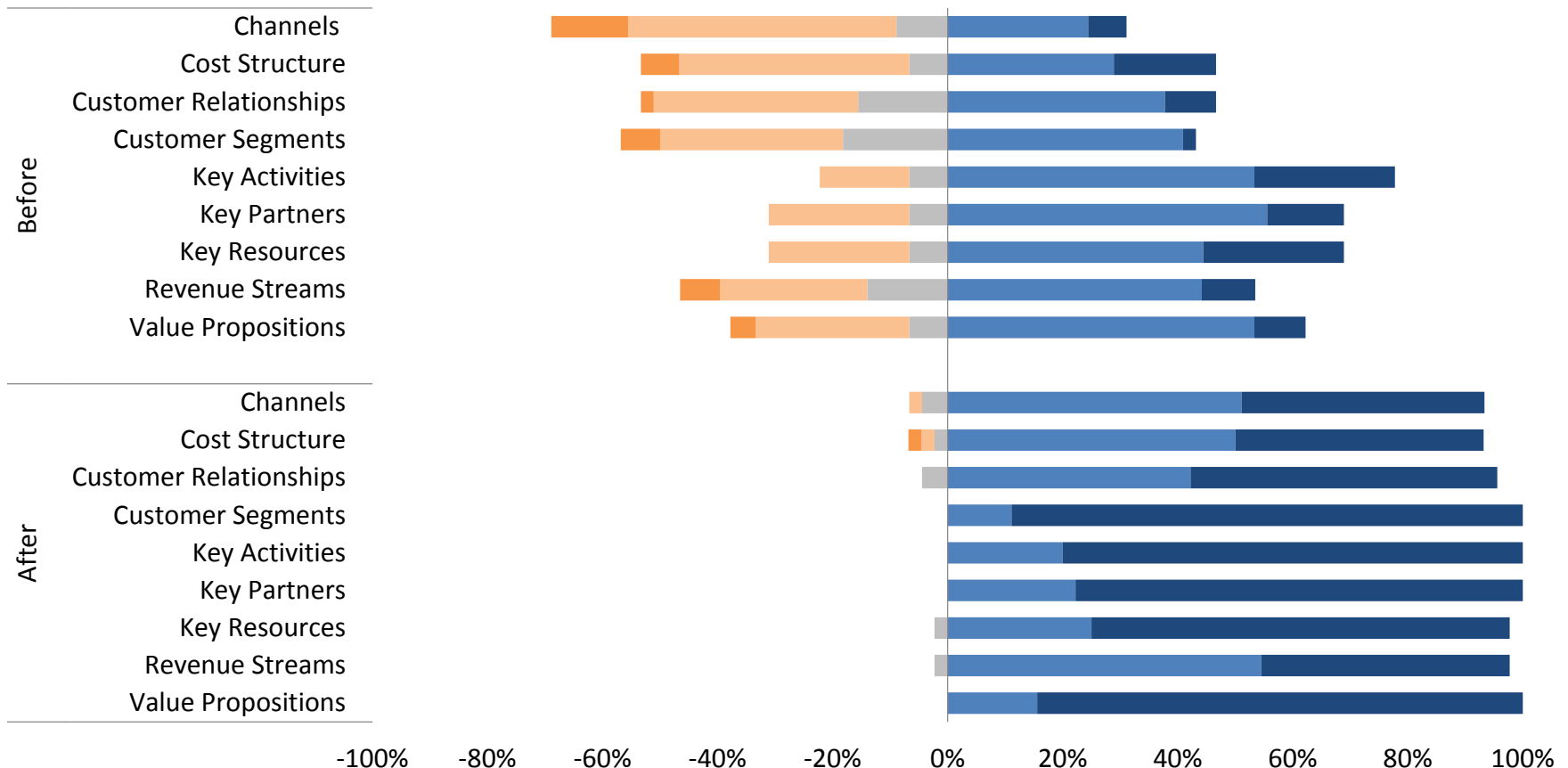
“We clarified the value propositions, who our target customers would be, revenue streams, customer relationships...”

“After going through I-Corps we understand we have to focus on a small subset [of customers] and prioritize segments based on their value propositions.”

Business Model Canvas Knowledge

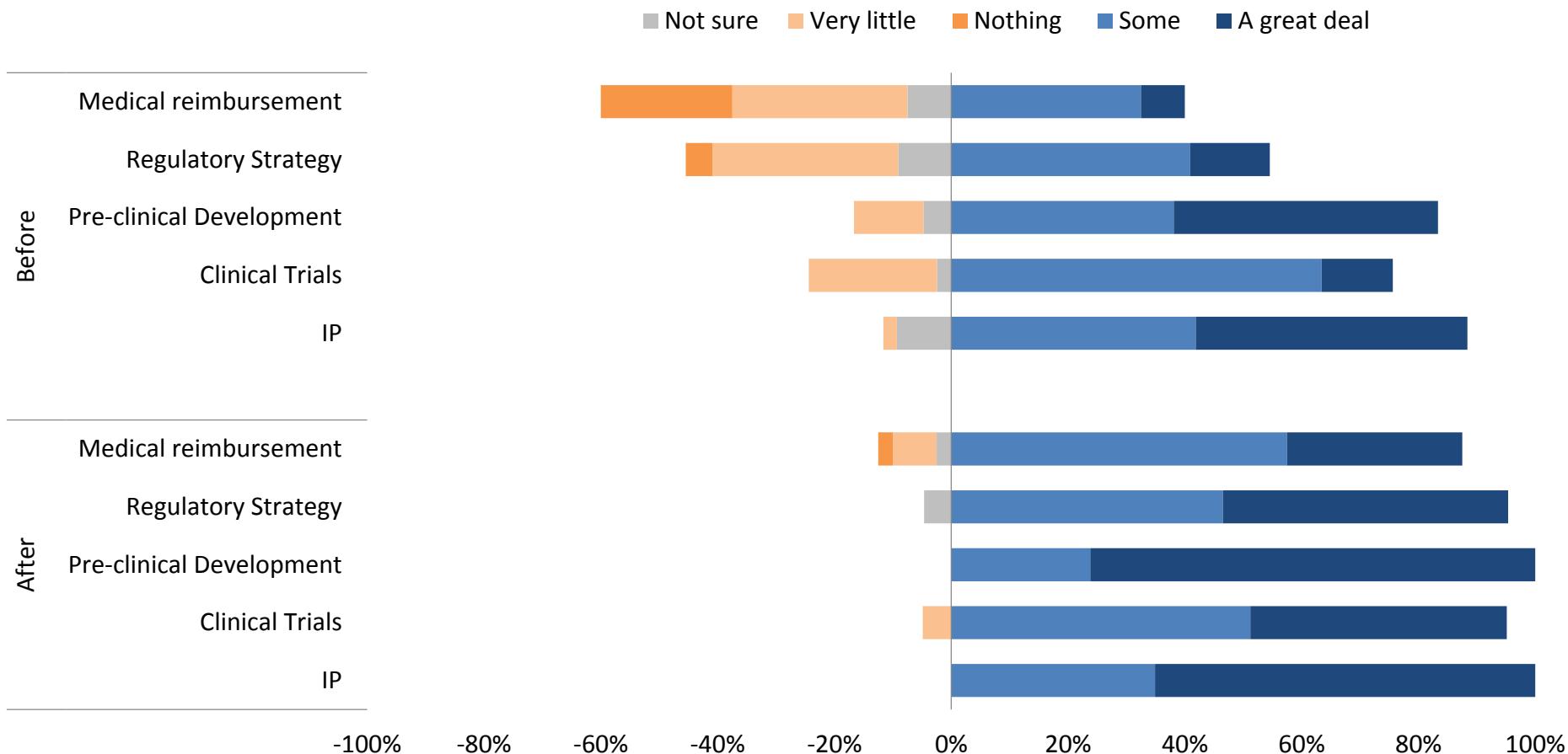
Please rate the following components of the I-Corps course to date in terms of their impact on your team's learning.

■ Not sure ■ Very little ■ Nothing ■ Some ■ A great deal



Life Science Commercialization Knowledge

Commercialization of life science technologies requires consideration of the following key topic areas. For each component, indicate your level of knowledge.





Edmund Pendleton

Lead Instructor, NIH & NSF I-Corps
Asst. Faculty Director, NSF I-Corps

Why *I-Corps*



I WANT YOU

FOR  **CORPS**
NSF Innovation Corps

NEAREST RECRUITING STATION

\$7 *Billion*

***"How can we increase the
economic impact of the
research dollars invested
every year?"***







CORPS
NSF Innovation Corps

Lean LaunchPad Course

Developed by
Entrepreneurs

Taught by
Entrepreneurs

Lean *Startup*

Steve Blank is a consulting associate professor at Stanford University and a lecturer and National Science Foundation principal investigator at the University of California at Berkeley and Columbia University. He has participated in eight high-tech start-ups as either a cofounder or an early employee.

Why the Lean Start-Up Changes Everything

by **Steve Blank**

HARVARD Business Review

TURN A GREAT IDEA INTO A GREAT BUSINESS

"Lean" is changing everything you know about starting a new venture **PAGE 63**

MAY 2012

EE Idea Watch
The Limits of Social Influence
Simon Aral

EE Spotlight
In Search of the Next Big Thing
An interview with Marc Andreessen

EE Case Study
The Unmanageable Star Performer
Abhishek Gupta



by Harvard Business School's Shikhar Ghosh shows, 75% of all start-ups fail.

But recently an important countervailing force has emerged, one that can make the process of starting a company less risky. It's a methodology called the "lean start-up," and it favors experimentation over elaborate planning, customer feedback over intuition, and iterative design over traditional "big design up front" development. Although the methodology is just a few years old, its concepts—such

"minimum viable product" and "pivoting"—have quickly taken root in the start-up world, and business schools have already begun adapting their curricula to teach them.

The lean start-up movement hasn't gone totally mainstream, however, and we have yet to feel its full impact. In many ways it is roughly where the big data movement was five years ago—consisting mainly of buzzword that's not yet widely understood, whose applications companies are just beginning to grasp. As its practices spread, they're turning the conventional wisdom about entrepreneurship on its head. New ventures of all kinds are attempting to improve their chances of success by following its principles of failing fast and continually learning. And despite the methodology's name, in the long term some of its biggest payoffs may be gained by the large companies that embrace it.

In this article I'll offer a brief overview of lean start-up techniques and how they've evolved. Most important, I'll explain how, in combination with other business trends, they could ignite a new entrepreneurial economy.

The
Economist

SPECIAL REPORT
TECH STARTUPS

January 18th 2014



A Cambrian moment

MIT Technology Review

VOL. 115 NO. 6 | \$5.99 US

HAS QUANTUM
COMPUTING
FINALLY
ARRIVED?

Upfront p24

HOW
TOMORROW'S
STARTUPS WILL
BE FUNDED

Business Report p75

TECH
TRANSFORMS
MUSIC, ART,
AND PROSE

Reviews p87



Buzz Aldrin,
Apollo 11
moonwalker,
would like a
word with you.

You Promised Me Mars Colonies. Instead, I Got Facebook.

We've stopped solving big problems.
Meet the technologists who refuse to give up. p26

MIT Technology Review

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AND PROSE

Reviews p117



Buzz Aldrin,
Apollo 11
moonwalker,
would like a
word with you.

**You Promised Me Mars Colonies.
Instead, I Got Facebook.**



facebook.®



**I-Corps first program to
apply lean startup principles
*to complex engineering,
technology, and science
based startups***

Life *Sciences?*



\$7 Billion



\$7 Billion



\$30 Billion

***"How can we increase the
economic impact of the
research dollars invested
every year?"***

Just like NSF grantees,

**Just like NSF grantees,
we believe there is a
better way to build
*life sciences startups.***

NIH *I-Corps*

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STEVE BLANK


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Entrepreneurship is a Calling

Entrepreneurship is 

Reinventing Life Science Startups – Evidence-based Entrepreneurship

Posted on **August 21, 2013** by [steveblank](#)

What if we could increase productivity and stave the capital flight by helping Life Sciences startups build their companies more efficiently?

We're going to test this hypothesis by [teaching a Lean LaunchPad class for Life Sciences](#) and Health Care (therapeutics, diagnostics, devices and digital health) this October at UCSF with a team of veteran venture capitalists.

[Part 1 of this post](#) described the issues in the drug discovery. [Part 2 covered medical devices and digital health](#). This post describes what we're going to do about it. And why you ought to take [this class](#).

When I wrote [Four Steps to the Epiphany](#) and the [Startup Owners Manual](#), I believed that Life Sciences startups didn't need Customer Discovery. Heck how hard could it be? You invent a cure for cancer and then figure out where to put the bags of money. (In fact, for oncology, with a successful clinical trial, this is the case.)

contact: info@kandsranch.com



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**In most cases, it's not
just about *the execution
of science.***

**You need to reduce
technology, regulatory, *and*
*market/customer risk...***

...by using an approach
driven by customer*
needs.

Why are *we here?*

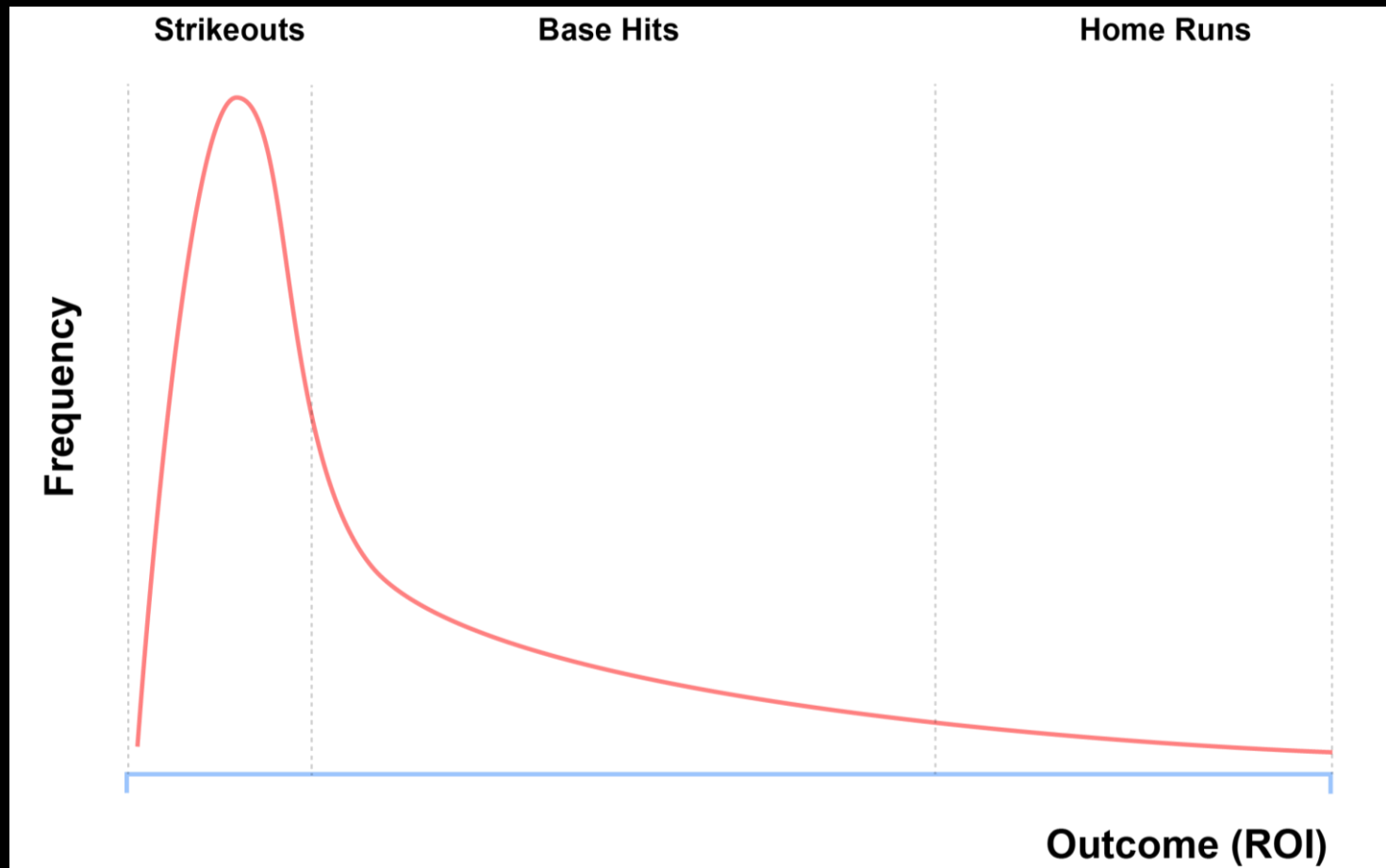
Our *Goal*

Improve *Odds*

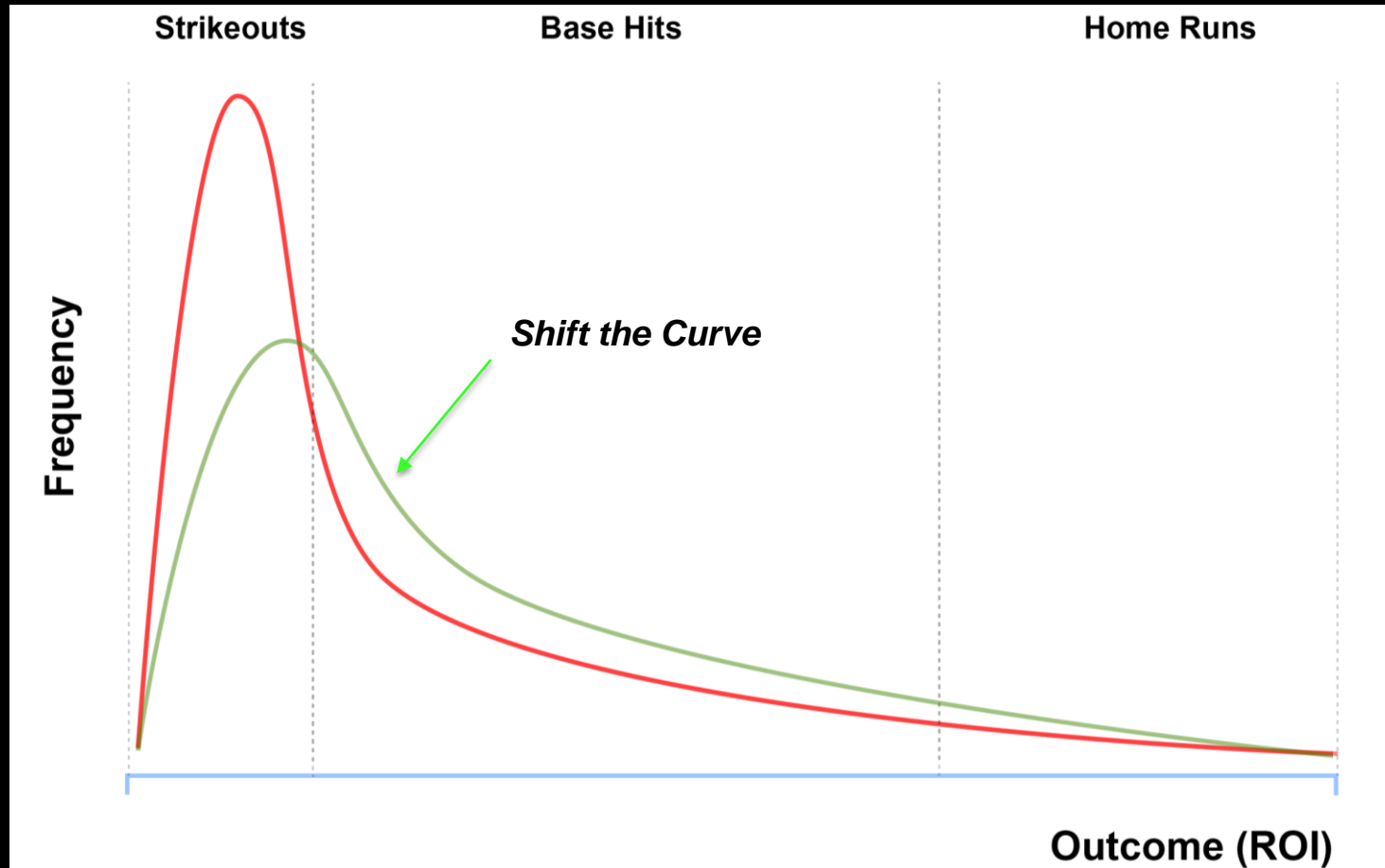
Pick *Winners*

~~Pick *Winners*~~

Startup *Statistics*



Create *More Winners*



How do we

build a startup?

Business Model *Canvas*



We use

Customer Development

to build Business

Models

Search for...

Problem-Solution Fit

***“Can you identify and validate a
problem or need in the market that
enough people care about?”***

Search for...

Product-Market Fit

***“Can you build and deliver a product
/ service that **satisfies** the customer
problem or need?”***

Search for...

Business Model Fit

***“Can you build and validate a
repeatable and scalable (profitable)
business model?”***

Search for *Business Model*

Get *out* of
the building!

Validated facts versus
untested guesses...

Evidence comes from

Evidence comes from

Customer Discovery
Interviews

This is what *we call...*

This is what we call...

Evidence Based
Entrepreneurship

What will *you do?*

Jump *In*



7 *Weeks*

100 *Interviews*

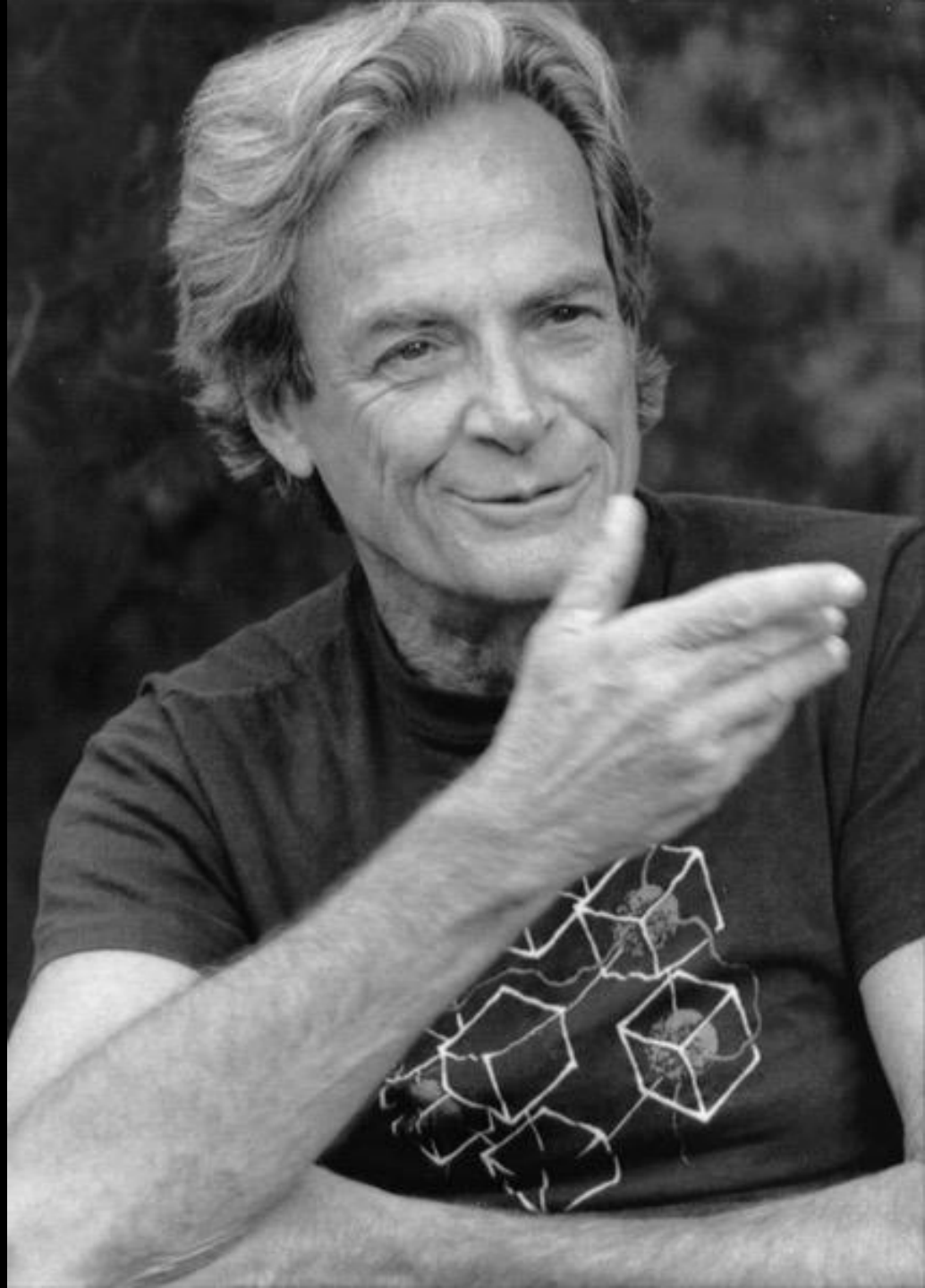
Gut *Feeling*



But *why?*

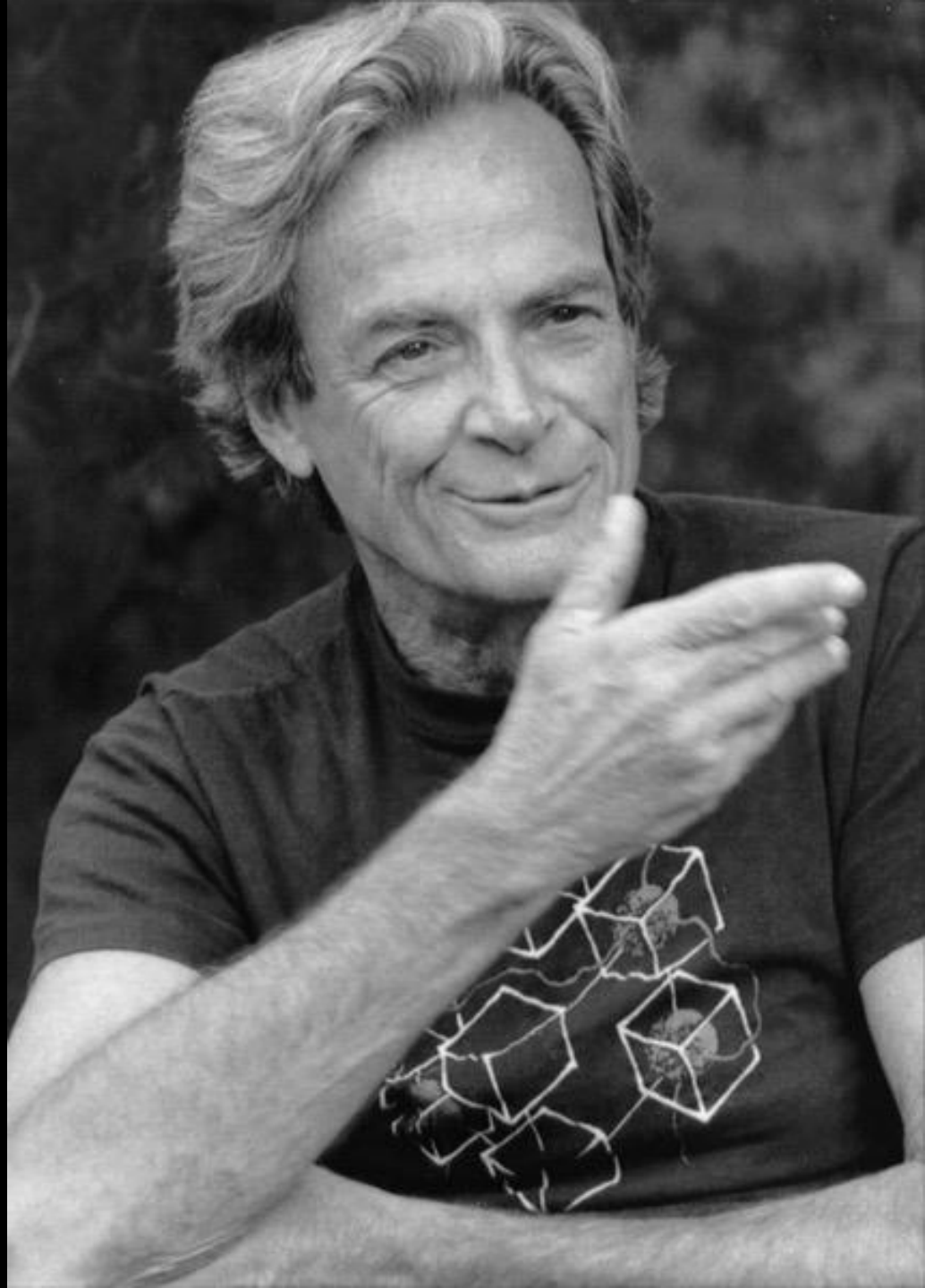
***“The first
principle is that
you must not
fool yourself***

– Richard Feynman



*“The first
principle is that
you must not
fool yourself,
and you are the
easiest person
to fool.”*

– Richard Feynman





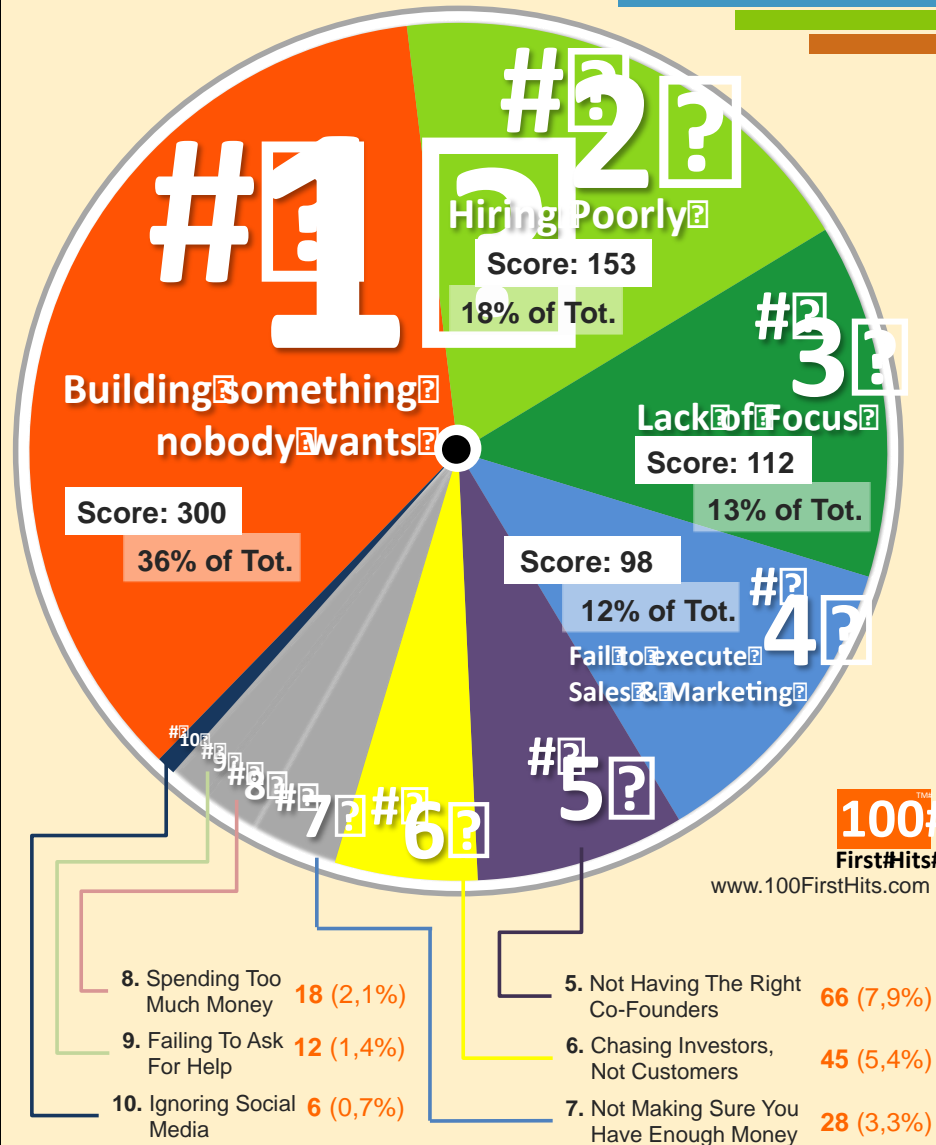
Everyone has *a plan...*

...until he gets *punched in the face.*”



TOP 10 ?

STARTUP MISTAKES



TOP 10?

Top Three

STARTUP MISTAKES



**Why is I-Corps
especially valuable for
*Life Sciences?***

There is A LOT to learn
in these markets.

**Markets are often
complex with *many
stakeholders.***

**Pathways to market
are often *lengthy,*
*costly, and complex.***

Startup risks are
generally very high.

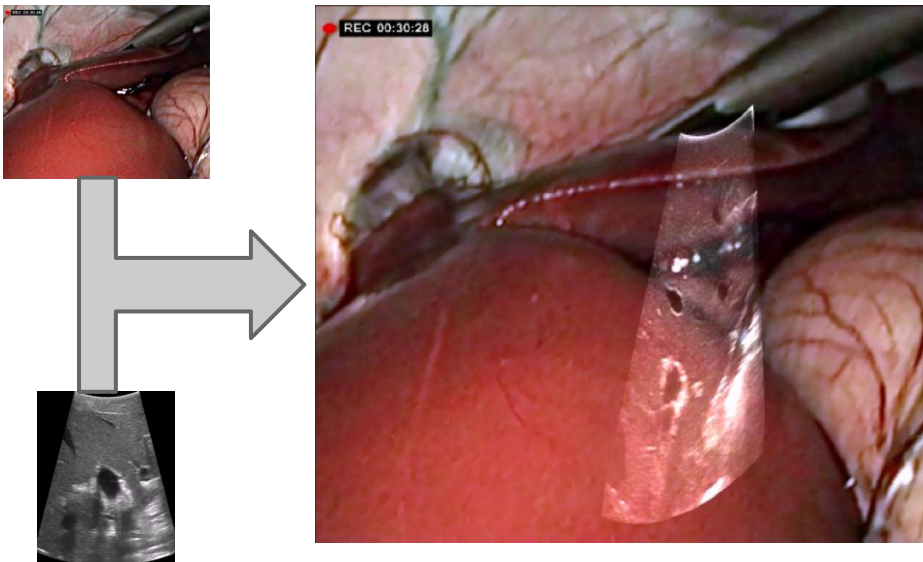
NIH ***I-Corps***

Team 10 - Team IGI Tech

Lessons Learned

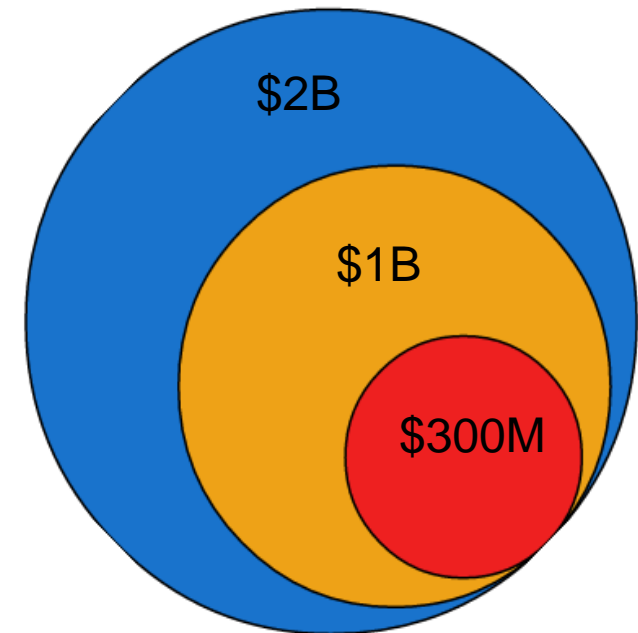


Product: Laparoscopic image fusion box that works with a surgeon's existing lap camera and ultrasound.



Interview count

	Total	In person	Video Chat	Phone
Total	102	50	6	43



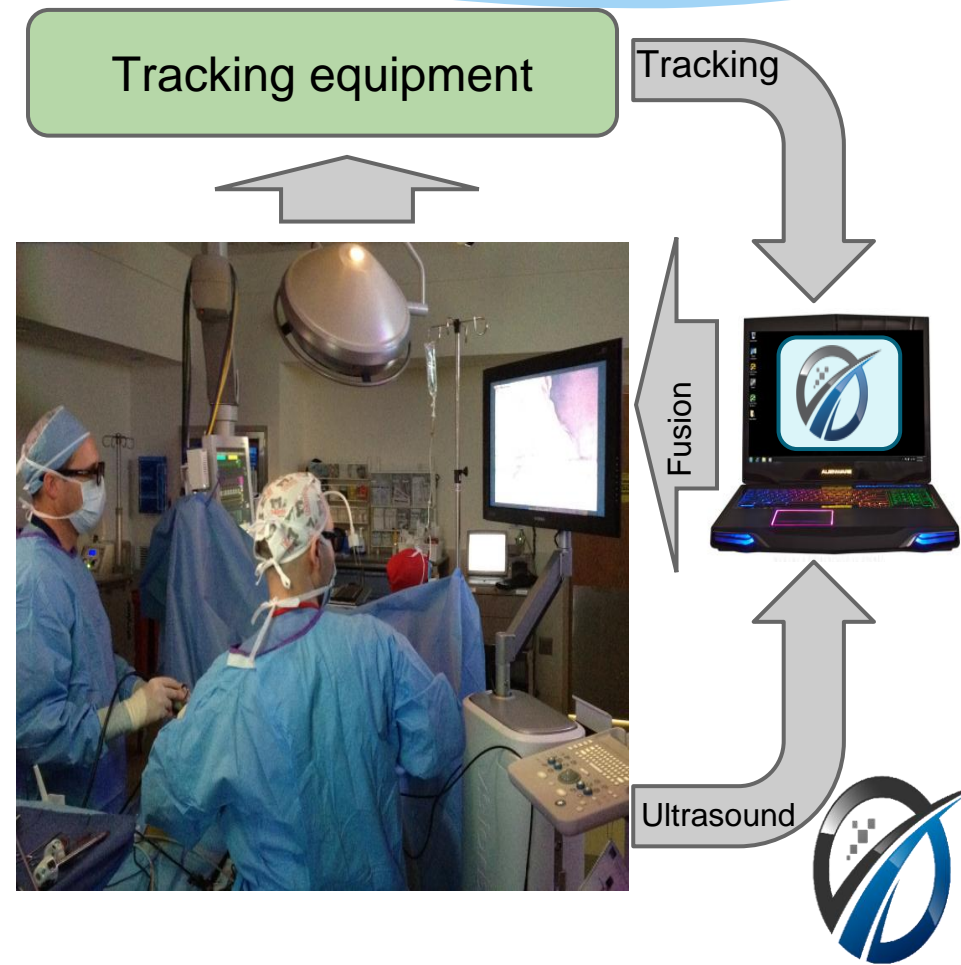
- Total Available Market - Every operating room in the US
- Served Available Market - Every operating room equipped for minimally invasive surgery (MIS)
- Target - Thoracic Surgeons in the US

Background: High performance processing of tracking and visualization

Patent pending (14/245,721)

“Perfect balance” -
Timothy Kane, MD

Clinical prototype at
Children’s National (IRB)





IGI Technologies Team



Principal Investigator
**Raj
Shekhar, PhD**

- Principal investigator within the Sheikh Zayed Institute for Pediatric Surgical Innovation
- 15 years of experience as a serial innovator of medical and surgical imaging technologies
- Two of his prior inventions have led to successful commercial products.



Entrepreneur
**William
Plishker, PhD**

- CEO of IGI Technologies
- specializes in building and leading startups, converting academic research into real-world products.
- 3 different Silicon Valley startups as an engineer and marketer
- Mayfield Fellow

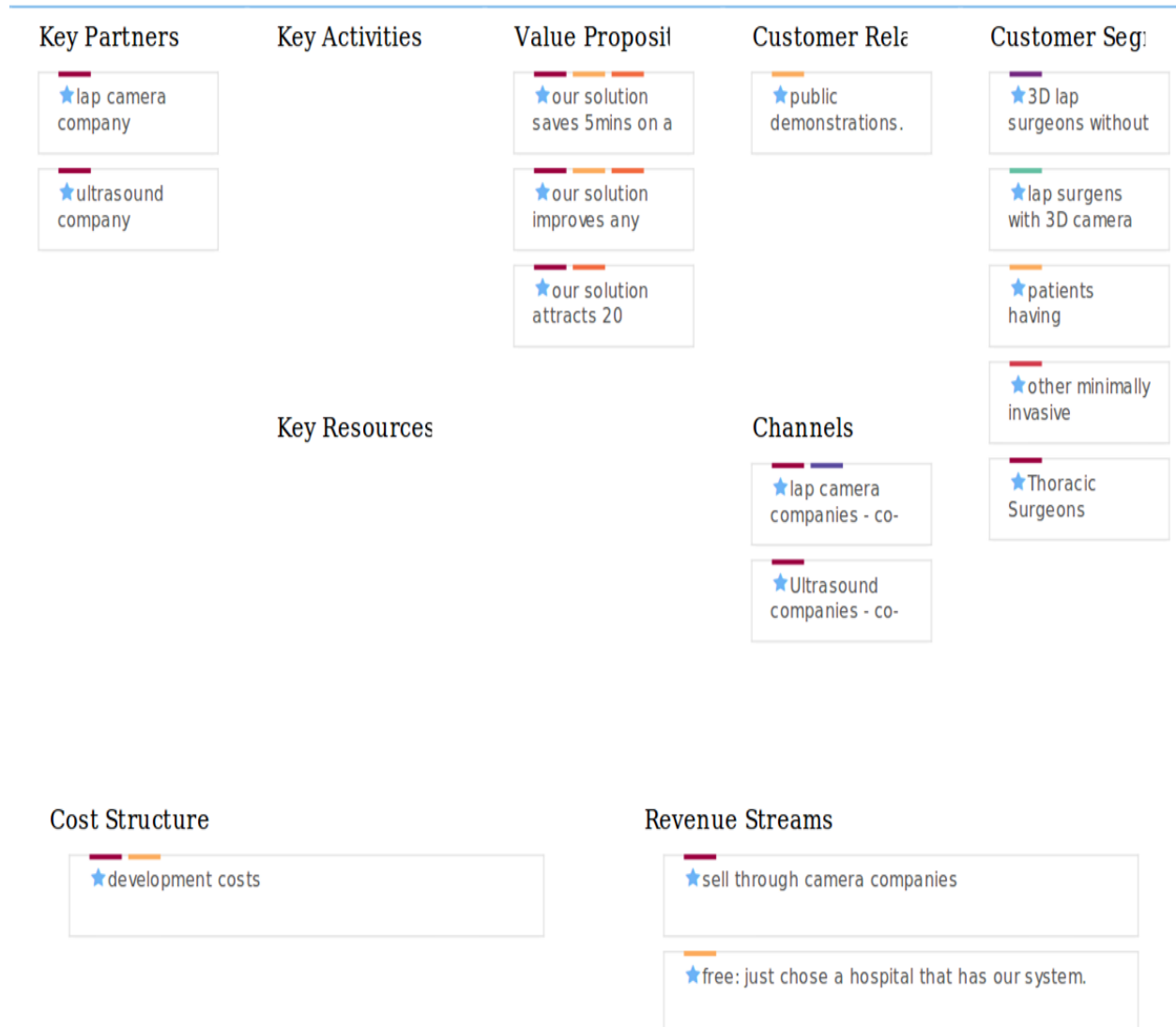


Industry Expert
**Mark
Chandler, MBA**

- Early stage medical device investor
- Expert in commercializing intellectual property (IP)
- Founder of Upstream Partners
- CEO of TAO Lifesciences



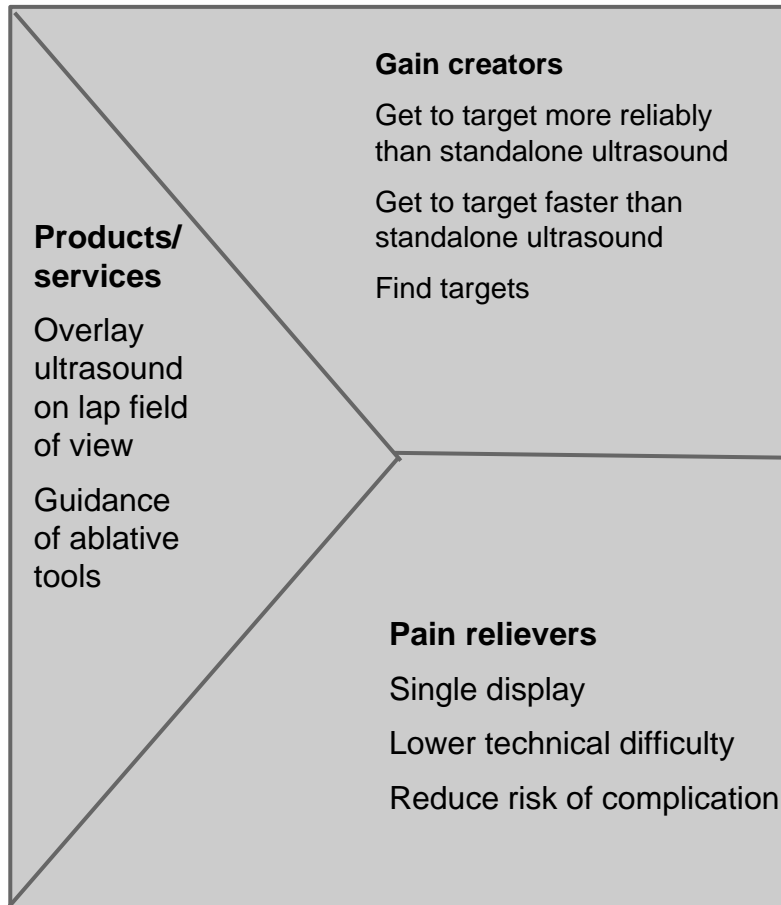
1st Business Canvas - what we thought



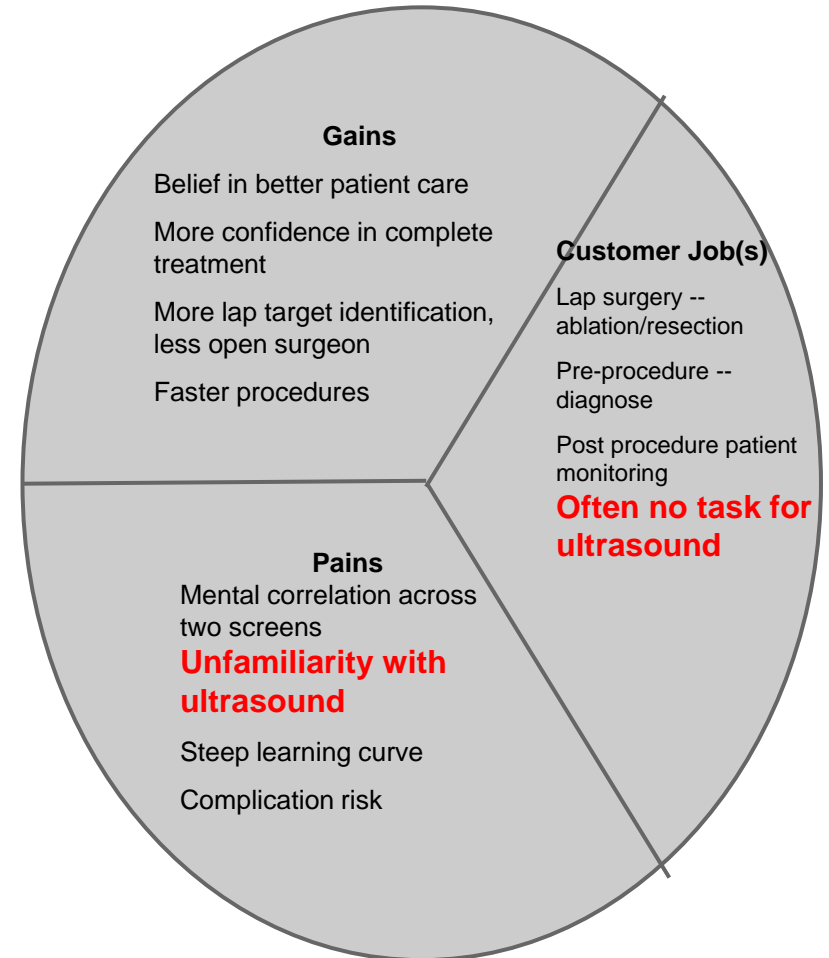


So we talked to surgeons - and learned we didn't know them as well as we thought

Surgeon Value Propositions



Surgeon Pains/Gains



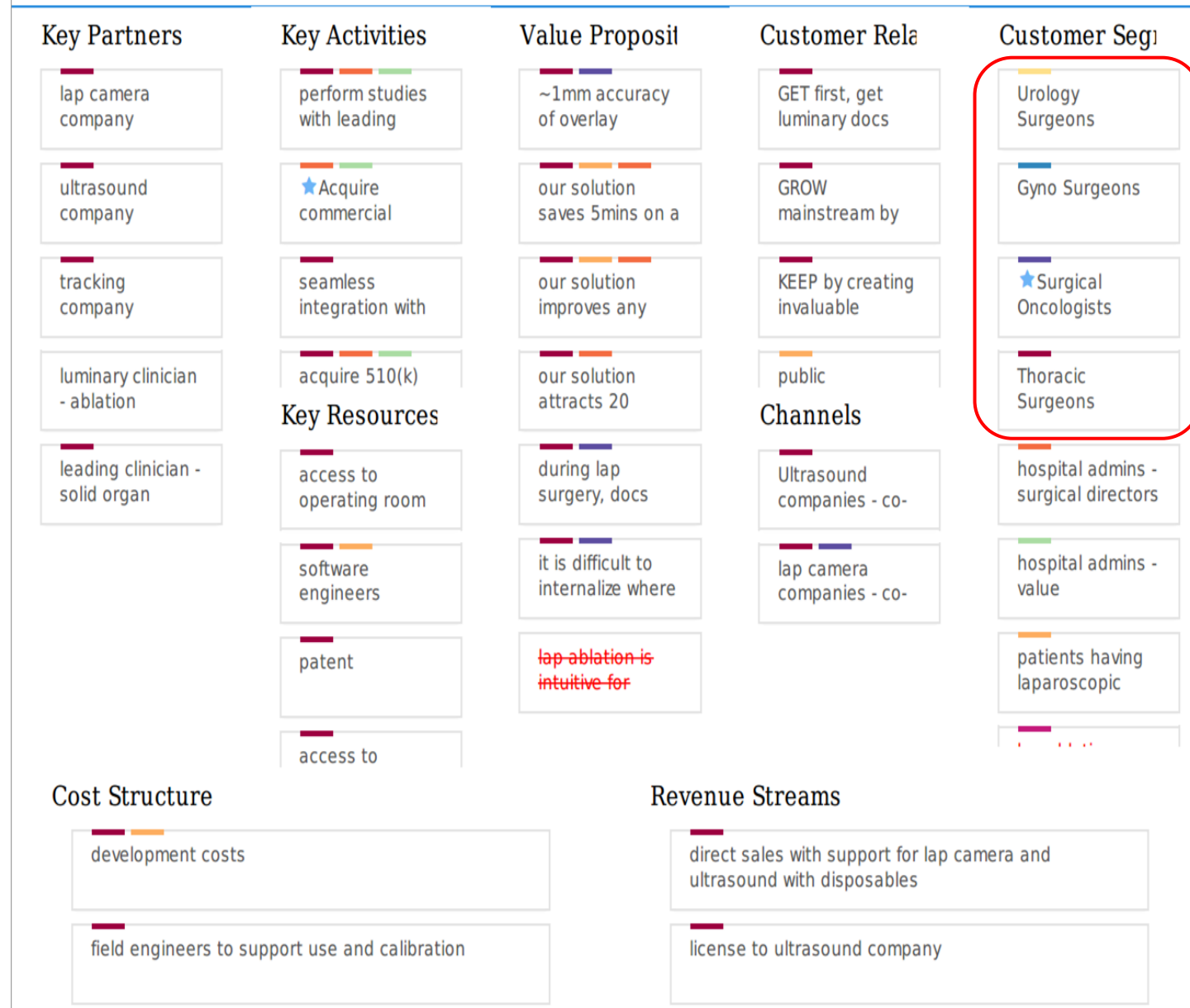
And we refined our surgeons into customer segments... and our value props



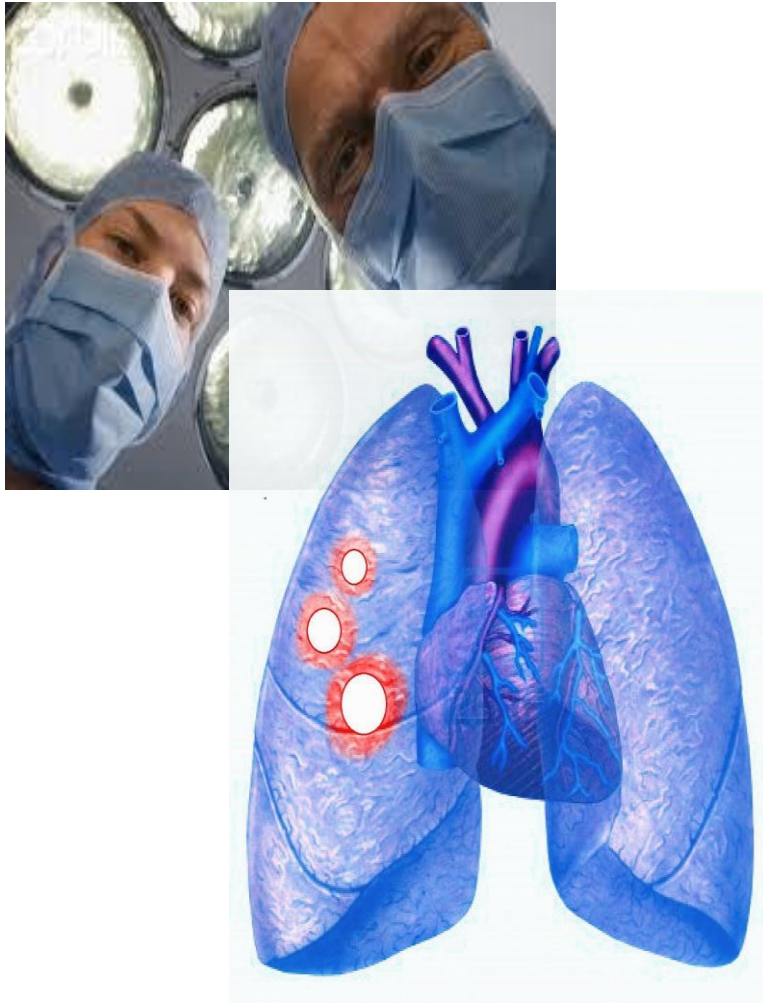
Field	High volume procedure	core need	currently uses lap ultrasound	Does NOT use robot
Urology	partial neph	See target and vessels (fast, sans radiologist, mobile) ⇒ do more laps (vs. open)	✓	
Gynecology	hysterec-tomies	See the ureter ⇒ fewer complications	no, but can read it	✓
Oncology	liver resections/ ablations	See the target with ablation needle critical sections ⇒ fewer readmissions	✓	✓
Thoracic	?	lesion location in collapsed lung ⇒ less invasive (more laps, no hand port)	no	✓



Business Canvas Iteration - CS Refinement



We kept talking to surgeons - and found patterns in thoracic surgery



Pains

- Disorienting
- Hour-long search
- *“Would do anything to localize tumors minimally invasively”*
- 50-100 cases a year at academic hospitals

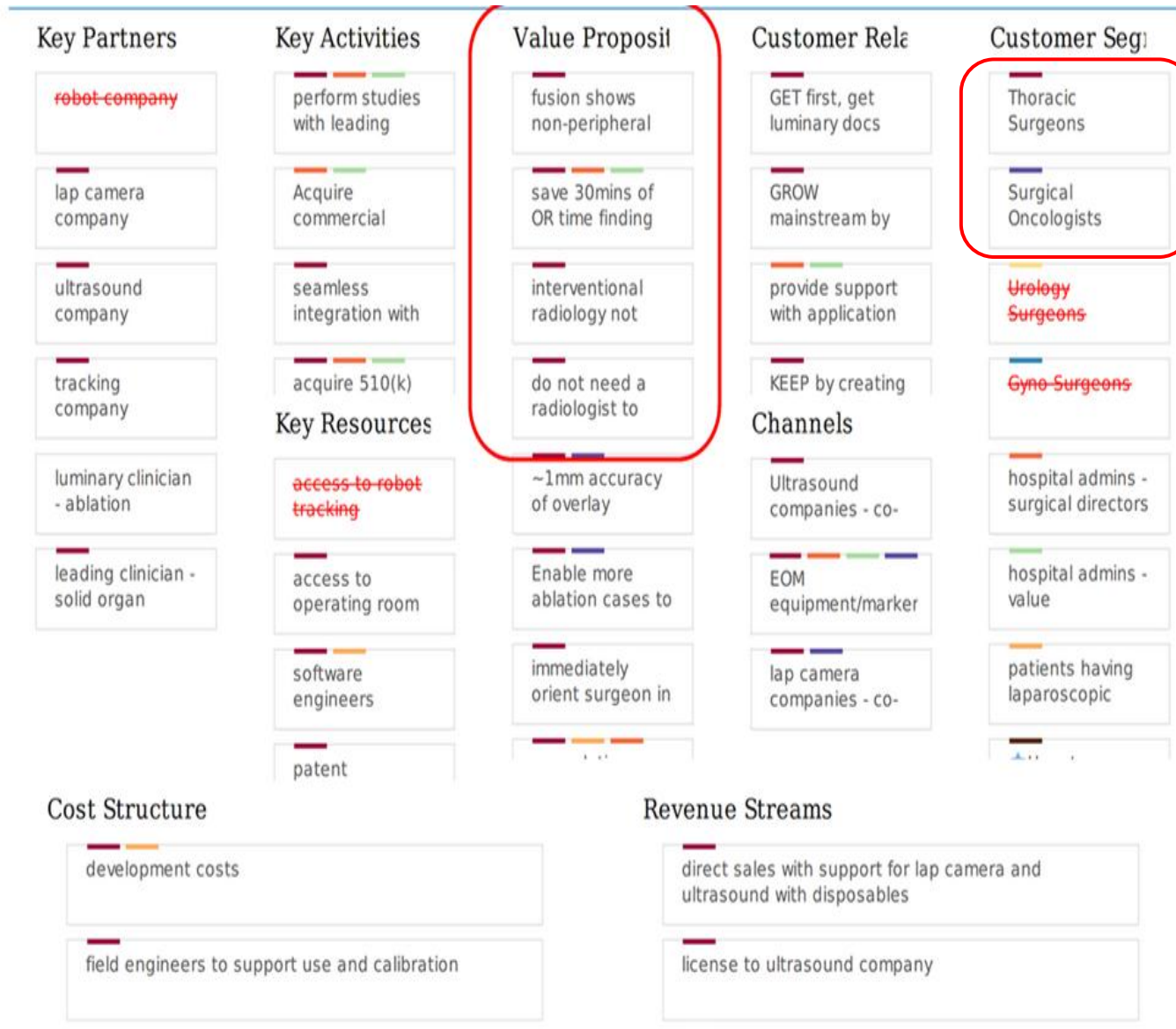


Customer segments - what we learned

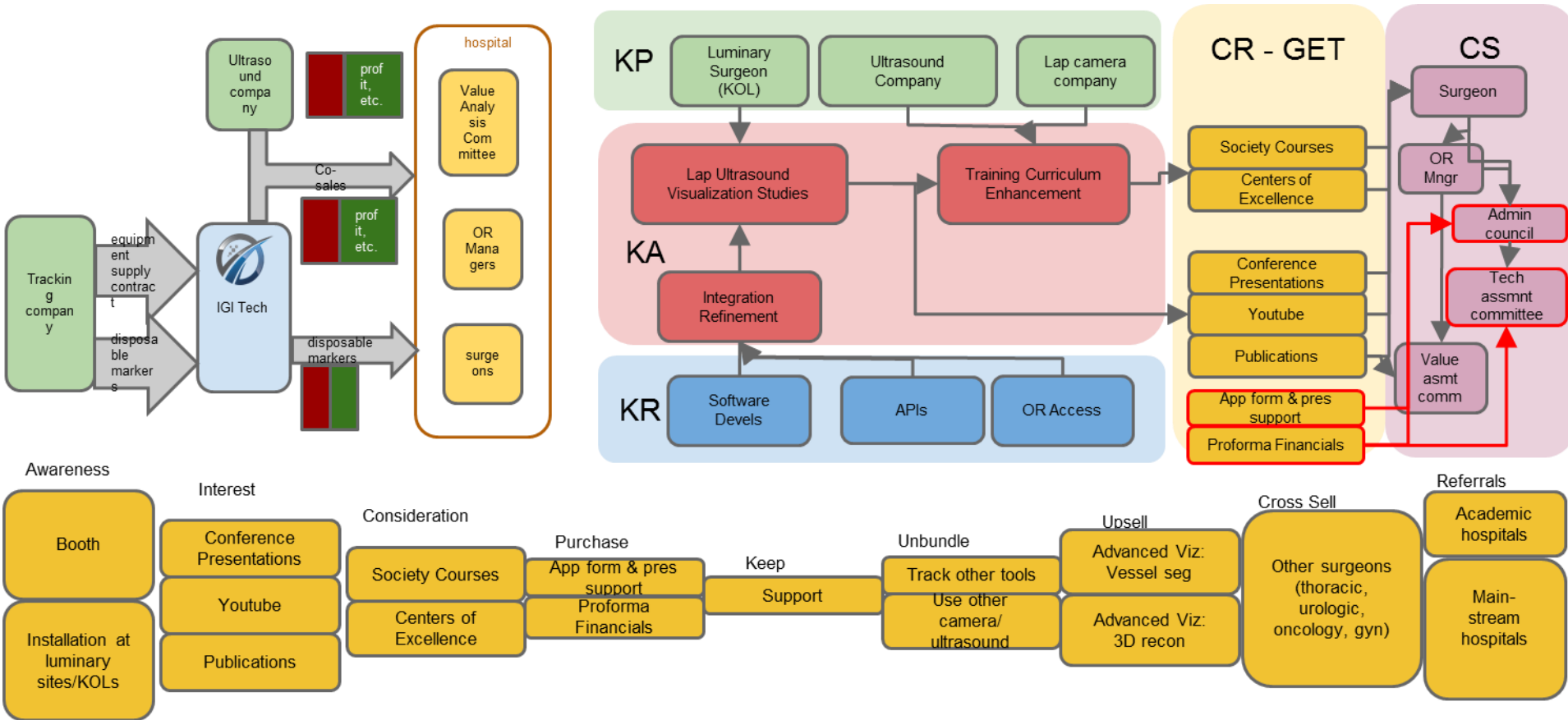
(# of people overall supporting)

	High volume procedure	core need	uses lap ultrasound	Does NOT use robot
Urology	partial neph	See target and vessels ⇒ do more laps (vs. open)	✓	
Gyn	hysterectomies endometriosis?	endomet surgery is sensitive to depth ⇒ provide real-time depth (1mm accuracy) to prevent uterus punctures (2)	no, and most (3) can't justify port	small but growing
Oncology	focus on ablations	Losing cases to interv rads (9) ⇒ tool nav in lap ablation is hard, we would track everything in one place	✓	✓
Thoracic	VATS for primary lung lesions	lesion location in collapsed lung ⇒ less invasive (more laps, no hand port), easier workflow (no fiducials), organ sparing, find smaller nodules, ⇒ no reliance on interv rad (12)	no, but willing to learn (10)	limited

Business Canvas - Thoracic Pivot



There were many other learnings...



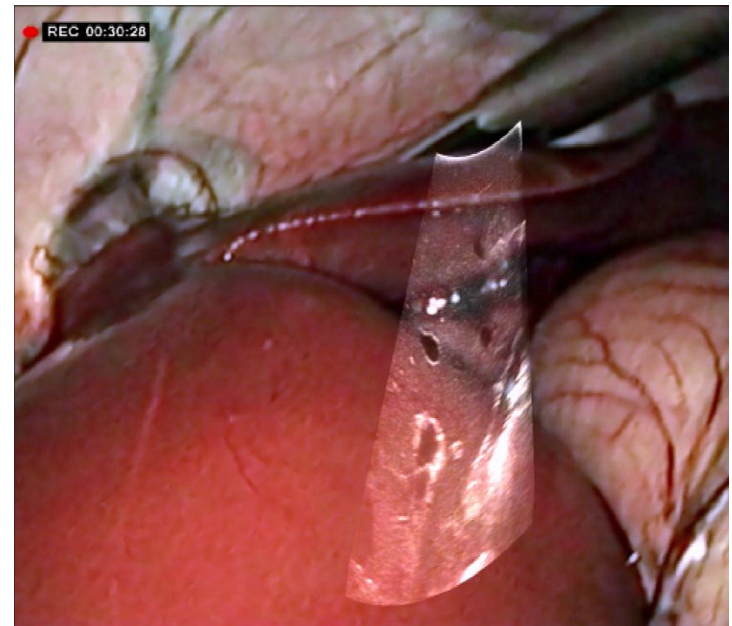
... and we are in a better position than ever for commercialization.



- 55 Surgeons
- 6 Radiologists
- 10 Surgical support
- 10 Hospital administrators
- 5 Ultrasound company officials
- 3 Robot company officials
- 2 Tracking company officials
- 4 Regulatory, reimbursement, IP specialists
- 7 Misc

Questions or comments:

info@igitechnologies.com



Updates since

- NIH CAP Program
- New surgeons involved
- More partners discussion
- Pitches
 - M2D2, ACA, various friendly angels



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